

Example 1 shows you how to describe a function *verbally*.

EXAMPLE 1 ►

The time it takes you to get home from a football game is related to how fast you drive. Sketch a reasonable graph showing how this time and speed are related. Give the domain and range of the function.



SOLUTION

It seems reasonable to assume that the time it takes *depends on* the speed you drive. So you must plot time on the *vertical* axis and speed on the *horizontal* axis.

To see what the graph should look like, consider what happens to the time as the speed varies. Pick a speed and plot a point for the corresponding time (Figure 1-1c). Then pick a faster speed. Because the time will be shorter, plot a point closer to the horizontal axis (Figure 1-1d).

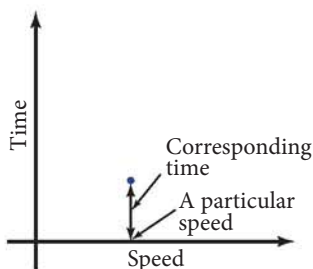


Figure 1-1c

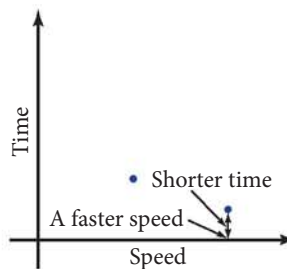


Figure 1-1d

For a slower speed, the time will be longer. Plot a point farther from the horizontal axis (Figure 1-1e). Finally, connect the points with a smooth curve, because it is possible to drive at any speed within the speed limit. The graph never touches either axis, as Figure 1-1f shows. If the speed were zero, you would never get home. The length of time would be infinite. Also, no matter how fast you drive, it will always take you some time to get home. You cannot arrive home instantaneously.

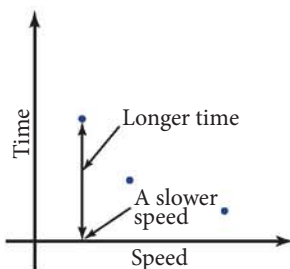


Figure 1-1e

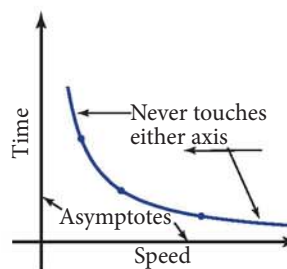


Figure 1-1f

Domain: $0 \leq \text{speed} \leq \text{speed limit}$

Range: time \geq minimum time at speed limit

The problem set will help you see the relationship between variables in the real world and functions in the mathematical world.